REMARKS/ARGUMENTS

I. Concerning the Amendments

The specification is amended to correct a typographical error.

Claims 2, 4, 6, 7, 10, 12, 33, 35, 41, 47, 53, 72-74 and 82-84 are canceled by amendments presented herein. Support for the amendments to Claim 1 can be found throughout the specification and in canceled Claims 2, 11, 12, and 78. Support for the amendments to Claim 30 can be found in the specification and in Claims 2, 11, 12, and 25. Support for the amendments to Claim 80 can be found throughout the specification, such as in the last paragraph of page 14, and in cancelled Claim 82 and the claims mentioned above. New Claims 87 and 88 are supported by the examples in the specification, as the examples were conducted without the use of any special equipment that would be necessary to apply a non-ambient electrostatic field. Various other self explanatory amendments are also presented.

II. Concerning the Citation of Additional References

Applicants previously cited the presence of several copending applications. As a precaution, even though Examiner could already be aware of references cited in the files of those copending applications, such references that recently appeared in the record of any of those copending applications and that are not of record in this application are included on a Form PTO/SB/08A attached to an Information Disclosure Statement filed herewith. The following table is provided for Examiner's convenience.

Attorney Docket No.	Serial No.	Examiner	Status
61590A	10/257,172	J. Fortuna	Pending
62733C	10/687,324	K.Bareford	Pending
62738C	10/687,322	J. Fortuna	Pending
62739C	10/691,890	K.Bareford	Pending

III. Concerning the Interview

Applicants thank Examiner for the interview of October 11, 2007 with the undersigned and Drs. John Roper and Michael Devon. The Interview Summary of record handed to the undersigned after the interview accurately summarizes the interview.

IV. Concerning the Comment on Priority

Examiner's comments regarding priority are noted. While Applicants do not necessarily agree with those comments, there is no current issue that requires a response from Applicants to those comments.

V. Concerning the Rejection Under 35 USC 112

The amendments presented herein are believed to obviate the basis of the rejections under section 112.

VI. Concerning the Rejection over Prior Art

Claims 1-4, 6, 9, 11-22, 25, 26, 30, 31, 33-44, 47, 48, 50, 53, 64-71, 73 and 75-81 stand rejected under 35 USC 103(a) as being unpatentable over Yokota, or WO 01/76884 (which is the WO publication of which Yokota is a continuation), in view of Kustermann, Takahashi et al. (hereinafter Takahashi) and Clarke et al. US 6,103,313 (hereinafter Clarke). Some pending dependent claims not subject to this rejection stand rejected based upon this combination of references together with additional references. Unless otherwise indicated, Applicants at the present time elect to address the patentability of the independent claims, and for the purposes of this response the patentability of the dependent claims stands or falls together with the patentability of their relevant independent claim.

The invention is the first process that is able to coat a high solids, multilayer curtain of reactive components at high speed, wherein cationic starch is a reactive component of the curtain, to produce a coated paper or paperboard having a printable top layer. The application contains three pending independent claims, namely Claims 1, 30 and 80.

Yokota teaches a reactive coating process conducted at relatively low speed using a relatively low solids curtain. Yokota has no generic teaching regarding substrate velocity or solids content. The coating processes conducted in the examples

of Yokota employ a substrate velocity of either 40 or 200 m/min. Applicants' calculations of the total solids content of the curtains of Yokota's examples indicate that the maximum solids employed was no more than 27 weight percent. The problem addressed by Yokota is poor layer purity due to intermingling of layer components caused by water transport phenomena in low solids coatings in the direction of the base paper, i.e. the base paper absorbs water. Yokota's solutions to limit water transport towards the base paper were as follows: (1) to use an isolating layer between two curtain layers that increase in viscosity when contacted with each other; (2) to use 2 adjacent layers that increase in viscosity over time when brought into contact with each other or mixed; (3) to precoat the substrate with water; or (4) to apply an interface layer of at least 90% water between the base paper and the other layers of the curtain. At column 2, lines 38-64, Yokota explains that photographic coatings contain gelatin, and that said coatings are cooled immediately upon coating to set the coating so that no intermingling of the coating layers is possible. He further explains that for his applications gelatin causes *problems*, as it degrades various properties of his coating materials. He also explains that, *unlike photosensitive materials*, most of his materials use a substrate that readily absorbs water. At column 5, lines 52-3, he explains that intermingling of layers results in unsatisfactory products. At column 6, lines 6-10 he teaches that his process prevents intermingling of layers. Of the 4 procedures taught by Yokota, Examiner has selected the reactive process (2).

Kustermann discloses a suction device for a single layer curtain coater. The device removes entrained air from the moving uncoated substrate. Kustermann teaches that his coating medium can contain from 5 to 80 percent solids, and that the coating weight per application is between 2 and 40 g/m^2. He defines the term "per application" to indicate that "several applicator units can be provided ... for applying multiple coatings to the material web." Kustermann, col. 2, lines 64-67. He discloses that his single layer per pass coater can run at more than 600 m/min., preferably more than 1,000 m/min.

Takahashi teaches a catch pan for a curtain coater, i.e. a device to cut and catch the curtain at start up and shut down of a coating operation without the formation of excess off grade coated substrate.

Clarke discloses that the application of an electrostatic field can expand the coating window in a method for nonreactive, multilayer curtain coating of low solids photographic coatings, and discloses a model equation for said method. Clarke, at col. 1, line 38, also states that "the primary limitations to coating speed are well known" citing Kistler and Schweizer. Clarke also teaches that coating speed as a function of viscosity goes through a maximum for a given web roughness.

None of the references mention the use of cationic starch. While Yokota mentions cationic-anionic reactions, Yokota lists only nitrogen-containing polymers as cationic polymers. Starch is mentioned by Yokota in col. 12, but that passage does not pertain to the reactive process of Yokota nor to cationic starch.

Examiner admits that several aspects of Applicants' claims are missing from Yokota, but argues that it would have been obvious to select the missing elements from the prior art without using hindsight and then combine them with Yokota in order to arrive at the claimed invention. Applicants respectfully submit that the references do not support a prima facie case of obviousness for the reasons stated previously in the record, which are incorporated herein by reference. In view of the fact that Examiner does not agree with those reasons, Applicants further emphatically submit that none of the references disclose multilayer curtain coating at > 45% solids at high speed, or at *any* speed. Examiner argues that Kustermann teaches curtain coating at > 600 m/min. at high solids, and that those skilled in the art at the time the invention was made would have known how to extend the teaching of Kustermann to multilayer curtains. However, this point is directly refuted by the declaration of Dr. Wolfgang Bauer, of record, at paragraph 10) and in the sentence bridging pages 3 and 4, which states as follows: "Specifically, the subject matter of the listed claims goes against conventional understanding in that the claimed combination of substrate velocity and curtain solids would have been thought to be outside the window of acceptable coating conditions for composite multilayer curtain coating." Applicants respectfully submit that the unrebutted facts contained in the declaration of Dr. Bauer are sufficient to counter the logic underlying the prima facie obviousness rejection, and request reconsideration of the rejection on that basis.

The obviousness standard was recently addressed by the U.S. Supreme Court. The Court makes it clear that analysis establishing an apparent reason to combine

known elements in the fashion set forth by the Office must be explicit and more than conclusory statements. "[T]here must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." KSR Int'l Co. v. Teleflex Inc., 127 S.Ct. 1727 (2007).

In KSR, the Court also addressed combinations as follows: "a court must ask whether the improvement is more than the predictable use of prior-art elements according to their established functions. Following these principles may be more difficult in other cases than it is here because the claimed subject matter may involve more than the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement." The Court further stated: "As is clear from cases such as *Adams*, a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." KSR, supra.

Kustermann and Takahashi are directed to mechanical devices, i.e. a suction device and a catch pan. They merely contain sweeping statements as to coating conditions. For example, Takahashi teaches that the catch pan can be used with any coating liquids "as long as they are coating liquids capable of being applied by curtain coating." However, Takahashi does not teach that there are no limits on curtain coating; to the contrary, Takahashi recognizes that coating speed is dependent on the coating conditions.

Regarding the teaching of Takahashi that conventional solids content can be used for single or multilayer curtain coating as long as the material is capable of being curtain coated, Applicants believe that Examiner reads Takahashi for more than it actually discloses. Examiner appears to be reading Takahashi as saying that *any* material, *regardless of solids*, can be applied successfully by curtain coating *regardless of the coating conditions*. Applicants respectfully submit that one of ordinary skill in the art would disagree with that interpretation of Takahashi; rather, Takahashi recognizes that there are limits to the coating window depending on the coating material that is being applied. Takahashi at column 1, line 27, acknowledges that coating speed is dependent on the coating conditions. Applicants further submit that the teaching of Takahashi must be taken in context. In other words, the coating conditions, including web speed and the solids content of the coating material, have

little to no bearing on whether Takahashi's catch pan will work. That is *not* a teaching that curtain coating can be done at *any* web speed for *any* solids. This rationale also applies to Kustermann; however, Kustermann is further limited to single layer curtain coating.

While Examiner would combine the low solids references of Yokota and Clarke with the "anything is possible " interpretation of the teachings relating to the mechanical devices of Takahashi and Kustermann, there is no guarantee that anyone exploring the resulting universe of nearly limitless combinations would stumble upon the present invention. As opposed to the factual situation in KSR, supra., which involved selecting a combination from a finite number of simple mechanical elements, the art of multilayer curtain coating is complicated, as evidenced by Alleborn and Clarke, and the rejection is based on references that provide far more than a finite number of possibilities. Furthermore, the references often contain conflicting teachings and contain no guidance that would direct one of ordinary skill toward the subject matter of Applicants' claims. In addition, there are too many parameters in the art of curtain coating to support the contention underlying the rejection that one of ordinary skill in the art would have been motivated to combine the references in the manner required to arrive at the subject matter of Applicants' claims.

"Obvious to try" was also addressed in KSR, supra., the Court stating as follows: "When there is a design need or market pressure to solve a problem and there are a *finite* number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp." (Emphasis supplied.) However, as Examiner recognizes: "given the *variety* of coating possibilities given by Yokota and the *variety* of materials that can be present and the teaching by Kustermann" (emphasis supplied) the number of variables associated with multilayer curtain coating systems do not provide a finite number of possibilities or solutions. Beyond that, the elements to be combined are not simple mechanical elements, but are complex physical/chemical elements.

The unpredictability of Examiner's proposed combination is further indicated by the fact that the Clarke model is highly dependent on constant viscosity, whereas Yokota teaches that his reaction increases the viscosity at an interface between two layers. Clarke's model does not account for more than one viscosity value for a

curtain. Yokota at column 8, lines 40 et seq. discusses the need to time his reaction carefully in order to not lose control of the changing viscosity. This is further evidence that one of ordinary skill in the art may have a limited ability to predict the behavior of changing Yokota's system by applying the teachings of Clarke. Applicants also note that dramatically increasing Yokota's speed could indeed lead to such loss of control.

Evidence of the use of hindsight in the construction of the rejection can be found in the fact that none of the references suggest the possibility of reactive, high-speed, high solids, multilayer curtain coating. While the numerical ranges of Applicants claims perhaps can be found in isolated references, there is no prior art that teaches or suggests that high solids, high speed, multilayer curtain coating has been done in the past. Applicants' specification is the only source of such a suggestion.

Claim 1 is directed to a reactive, multilayer curtain coating process using a curtain with a solids content of at least 45% at a web velocity of at least about 600 m/min. The prior art allegedly shows components of the invention, but does not teach a high solids, high speed, multilayer curtain coating process, either reactive or non-reactive. The art does not suggest the claimed process, and had no appreciation of how to practice such a process. See the Declaration of Dr. Bauer, of record, at paragraphs 4-7 and 9-13.

None of the references provide any examples of multilayer curtain coating at high speed with high solids, even using nonreactive curtain components. Accordingly, the references do not teach one of ordinary skill in the art how to practice the claimed invention.

Examiner argues that Clarke proves that that the solids content of the curtain would not prevent high speed multilayer curtain coating, and that Clarke is evidence that one would not expect solids to have an effect on coating speed. Applicants respectfully disagree. Clarke discloses a model that clearly was developed for a low solids, nonreactive system. Therefore, Clarke has no predictive effect for high solids curtains. Clarke's model equations, developed for low solids compositions, include variables for density and viscosity. It is well-known that solids content will have

some effect on density and viscosity. Therefore, Clarke does not prove that solids have no effect on coating speed.

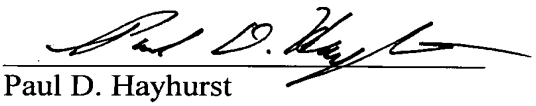
Examiner largely discounts the declaration of Dr. Bauer, citing a portion of MPEP 716.01(c)III. This section of the MPEP also states as follows: "Although factual evidence is preferable to opinion testimony, such testimony is entitled to consideration and some weight so long as the opinion is not on the ultimate legal conclusion at issue. While an opinion as to a legal conclusion is not entitled to any weight, the underlying basis for the opinion may be persuasive." Examiner argues that Yokota was under no duty to provide examples at the highest possible speed that could be coated. However, as argued above, this does not overcome the fact that Yokota does not disclose multilayer curtain coating at high solids and high web velocities. Dr. Bauer cites the Alleborn article as evidence that it would not be a simple matter to take a high speed single layer coating process, e.g. that of Kustermann, and convert it to a multilayer coating process operating at the same speed. Neither Clarke, nor any other prior art, indicates otherwise.

Applicants respectfully submit that the prior art does not support a prima facie case of obviousness. However, assuming *arguendo* that the prior art does support a prima facie case, Applicants assert that Applicants' process produces surprising results. Comparative Experiment B and Example 5 of the subject application compare the printing properties of coated paper prepared according to the invention (Example 5) to the properties of a coated paper prepared using conventional starch (Comparative Experiment B). The printing properties of coated paper prepared according to the procedure of these experiments are summarized in Table 5 of the subject patent application. The coated paper of Example 5 exhibited 2 points better Paper Gloss, from 5 to 10 points better Ink Gloss, and 19% improved stiffness ((0.050 - 0.042)/0.042) compared to the coated paper of Comparative Experiment B. It is well known that ink gloss increases as paper gloss increases, and that the magnitude of the increase will be similar. However, as mentioned hereinabove in this paragraph, the ink gloss was vastly improved (5-10 points) for Example 5 compared to the increase in paper gloss (2 points). This improvement due to the use of cationic starch in place of anionic starch was unexpected.

VII. Conclusion

For the foregoing reasons, reconsideration of the claims and passing of the application to allowance are solicited.

Respectfully submitted,



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